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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,140	07/21/2006	Naoko Sawatari	CU-4971 RJS	4987
26530 7590 05/28/2008 LADAS & PARRY LLP 224 SOUTH MICHIGAN AVENUE SUITE 1600 CHICAGO, IL 60604				
EXAMINER				
HON, SOW FUN				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/587,140

Applicant(s)

SAWATARI ET AL.

Examiner

SOPHIE HON

Art Unit

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-21 and 24-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12-21, 24-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
- Paper No(s)/Mail Date 10/10/06, 3/31/08
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

Rejections Withdrawn

1. The obviousness-type double patenting rejection of claims 12-28 over claims 1, 6-14 of copending application no. 11/039,278 is withdrawn due to Applicant's terminal disclaimer filed 02/07/08.
2. The obviousness-type double patenting rejection of claims 12, 19, 21, 23, 25, 27 over claims 11, 19, 21, 23, 25, 27 of copending application 10/587,069 is withdrawn due to Applicant's terminal disclaimer filed 02/07/08.
3. The 35 U.S.C. 102(b) and 103(a) rejections of claims 12, 19, 21, 23, 25, 27 over Gibbons as the primary reference are withdrawn due to Applicant's amendment filed 02/07/08.
4. The 35 U.S.C. 103(a) rejections of claims 12-18, 20, 22, 24, 26, 28 over Kim in view of Gibbons as the primary combination are withdrawn due to Applicant's amendment filed 02/07/08.

New Rejections

Claim Objections

5. Applicant is advised that should claim 12 be found allowable, claim 21 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing

one claim to object to the other as being a substantial duplicate of the allowed claim.

See MPEP § 706.03(k).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 12, 19, 21, 25, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibbons (US 2003/0232930 A1) in view of Yamazaki (US 2003/0058210 A1).

Regarding claim 12, 19, 21, Gibbons teaches a liquid crystal display (abstract), wherein the liquid crystal display comprises a ferroelectric liquid crystal sandwiched between two substrates (cell, [0185]), wherein an electrode and a photoalignment film are each successively formed on opposite faces of the substrates facing each other (electrodes 2 on substrates 1, and optical alignment layers 3 formed thereon, cell, Fig.1, [0086]). Gibbons teaches that a constituent material of the respective photoalignment layer is a photoreactive material which generates a photoreaction to give anisotropy to the photoalignment film (capable of dimerization upon optical alignment, [0040]). Gibbons teaches that the constituent material of the respective photoalignment layer can have a different composition from each other (the pair of substrates can contain optical alignment layers, the second alignment layer comprising the same or a different polymer [0082]) with the ferroelectric liquid crystal sandwiched therebetween. Gibbons is silent regarding the phase characteristics of the ferroelectric liquid crystal, and thus

fails to disclose that it does not have a smectic A phase in a phase series thereof, or that it exhibits mono-stability.

However, Yamazaki teaches that when a monostable ferroelectric liquid crystal that does not have a smectic A phase in a phase series thereof (electrooptic characteristic of monostable FLC that exhibits isotropic-cholesteric-chiral smectic C phase transition, [0158]) is used in a liquid crystal display, it produces a half V-shaped switching mode, for the purpose of providing a display with low voltage driving and gray scale capability (such electrooptical characteristic, [0159]).

Therefore, since Gibbons is silent regarding the phase characteristics of the ferroelectric liquid crystal, it would have been necessary and hence obvious to have looked to the prior art for suitable types. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a monostable ferroelectric liquid crystal that does not have a smectic A phase in a phase series thereof, as the ferroelectric liquid crystal in the liquid crystal display of Gibbons, in order to provide a liquid crystal display with low voltage driving and gray scale capability, as taught by Yamazaki.

Regarding claim 25, Gibbons teaches that the liquid crystal display is driven by an active matrix system using thin film transistors (active elements such as thin film transistors, [0086], active matrix liquid crystal display, [0168]).

Regarding claim 27, while Gibbons teaches that the liquid crystal display can be a color one ([color filter, [0086]), Gibbons is silent regarding the type of color system

driver, and thus fails to teach that the liquid crystal display is driven by a field sequential color system.

However, Yamazaki teaches that a liquid crystal display driven by a field sequential color system ([0157]) provides very high color resolution and reduced flicker of image (abstract, three times resolution of conventional color display, [0011]).

Therefore, since Gibbons is silent regarding the type of color system driver, it would have been necessary and hence obvious to have looked to the prior art for suitable types. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a field sequential color system to drive the color liquid crystal display of Gibbons, in order to provide very high color display resolution, as taught by Yamazaki.

7. Claims 12-21, 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 6,153,272) in view of Gibbons (US 2003/0232930 A1) and Yamazaki (US 2003/0058210 A1) and .

Regarding claims 12-13, 19-21, Kim teaches a liquid crystal display (column 8, lines 5-10) comprising a ferroelectric liquid crystal (column 14, lines 60-62) sandwiched between two substrates (liquid crystal cell, column 7, lines 15-20) wherein a photoalignment layer is formed on opposite faces of the two substrates facing each other (two glass plates that have been coated with a thin film of a polymer that have been optically fabricated, column 7, lines 15-20, polymer surface exposed to polarized light to align the covalently bound anisotropic component, column 7, lines 60-65). Kim

fails to teach that the constituent of the first photoalignment alignment film has a different composition from the constituent material of the second photo alignment film.

However, Gibbons teaches a liquid crystal display (abstract) comprising a ferroelectric liquid crystal sandwiched between two substrates (cell, [0185]), where an electrode and a photoalignment film are each successively formed on inner sides of the substrates facing each other (electrodes 2 on substrates 1, and optical alignment layers 3 formed thereon, cell, Fig.1, [0086]), and where the constituent material of the respective photoalignment layer can have a different composition from each other (the pair of substrates can contain optical alignment layers, the second alignment layer comprising the same or a different polymer [0082]), for the purpose of providing a hybrid alignment of the liquid crystal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided an alternate embodiment where the constituent of the first photoalignment alignment film has a different composition from the constituent material of the second photo alignment film in the liquid crystal display of Kim, in order to obtain a hybrid alignment of the liquid crystal, as taught by Gibbons.

Kim fails to disclose that an electrode is successively formed on the opposite faces of the two substrates facing each other in the liquid crystal display.

However, Yamazaki teaches that a liquid crystal display which comprises a ferroelectric liquid crystal (1561, [0146]) sandwiched between two substrates ([0136]) has an electrode and an alignment film each successively formed on opposite faces of

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the substrates facing each other (alignment layer 1557 is formed over the active matrix substrate, the counter substrate consists of counter electrode 1559, alignment layer 1560, [0134], Fig.18 B-C), wherein the electrodes are present for the purpose of providing the electrical stimulus for the liquid crystal medium of the liquid crystal cell.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have formed an electrode on the opposite faces of the substrates facing each other in the liquid crystal display of Kim, in order to provide the electrical stimulus for the liquid crystal medium of the liquid crystal display, as taught by Yamazaki.

In addition, while Kim teaches the use of liquid crystal that is smectic C (column 5, line 31). Kim is silent regarding the phase characteristics of the ferroelectric liquid crystal, and thus fails to disclose that it does not have a smectic A phase in a phase series thereof, or that it constitutes a single phase.

However, Yamazaki teaches that when a monostable ferroelectric liquid crystal that does not have a smectic A phase in a phase series thereof (electrooptic characteristic of monostable FLC that exhibits isotropic-cholesteric-chiral smectic C phase transition, [0158]) is used in a liquid crystal display, it produces a half V-shaped switching mode, for the purpose of providing a display with low voltage driving and gray scale capability (such electrooptical characteristic, [0159]).

Therefore, since Kim is silent regarding the phase characteristics of the ferroelectric liquid crystal, it would have been necessary and hence obvious to have

looked to the prior art for suitable types. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a monostable ferroelectric liquid crystal that does not have a smectic A phase in a phase series thereof, as the ferroelectric liquid crystal in the liquid crystal display of Kim, in order to provide a liquid crystal display with low voltage driving and gray scale capability, as taught by Yamazaki.

Regarding claims 14-16, Kim teaches that the photo-isomerization-reactive compound is a compound that has dichroism such that different absorptivities are exhibited depending on a polarization direction thereof and further generates the photo-isomerization reaction by light irradiation, wherein the photo-isomerization reaction is a cis-trans isomerization reaction (polymer surface that has a covalently bound anisotropic component that can align in response to polarized light, column 1, lines 62-65, when exposed to a polarized light source, the azobenzene groups have the highest isomerization probability, column 5, lines 55-60, thermally induced cis-to-trans isomerization spontaneously follows, column 5, lines 55-60).

Regarding claims 17-18, Kim teaches that the azobenzene skeleton can be in the molecule of a compound (azobenzene group is incorporated into the main chain of the polymer, column 3, lines 35-38), or a side chain in a polymerizable monomer (azobenzene group is a side group on the main chain of the polymer, column 3, lines 35-36).

Regarding claim 24, Kim teaches that teaches that the liquid crystal layer only consists of the liquid crystal (liquid crystal medium may contain a single liquid crystal,

column 4, lines 32-35) and does not contain any polymer network. Thus the ferroelectric liquid crystal of Kim is a liquid crystal which constitutes a single phase as defined in Applicant's specification (page 30).

Regarding claims 25-26, Kim fails to disclose that the liquid crystal display is driven by an active matrix system using thin film transistors.

However, Yamazaki teaches that a liquid crystal display is conventionally driven by an active matrix system ([0006]), using thin film transistors (TFT, [0139]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used an active matrix system using thin film transistors to drive the liquid crystal display of Kim, in order to provide a conventionally driven liquid crystal display, as taught by Yamazaki.

Regarding claims 27-28, Kim fails to disclose that the liquid crystal display is a color one and thus fails to teach that the liquid crystal display is driven by a field sequential color system.

However, Yamazaki teaches that a liquid crystal display driven by a field sequential color system ([0157]) provides very high color resolution and reduced flicker of image (abstract, three times resolution of conventional color display, [0011]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a field sequential color system to drive the liquid crystal display of Kim, in order to obtain a color liquid crystal display with very high color display resolution, as taught by Yamazaki.

Response to Arguments

8. Applicant's arguments have been considered but are mostly moot in view of the new ground(s) of rejection. The arguments that are still pertinent to the present prior art rejections are addressed below.

9. Applicant argues that in stating that "the pair or substrates can both contain optical alignment layers or a conventional alignment layer (e.g. mechanically buffed) can be used as the second alignment layer comprising the same or a different polymer" ([0082]), Gibbons is not teaching that the constituent material of the respective photo alignment layer has a different composition from each other, but rather is teaching that (q) optical alignment layers can be formed on the pair of substrates, or alternatively, an optical alignment layer can be formed on one of the substrates and a conventional alignment layer (such as rubbing layer) can be used as the second alignment layer comprising the above-mentioned hybrid polymer or a different polymer. Applicant adds that Example 19 of Gibbons displays the same kind of hybrid polymer used in the two optical alignment layers, and thus Gibbons is completely silent regarding the use of different polymers for the respective two optical alignment layers.

Applicant is respectfully apprised that the interpretation by Applicant of the statement by Gibbons is a narrower one than the interpretation by the Office. Applicant is respectfully directed to the fact that Gibbons does not specify that the optical alignment layers comprise the same polymer, and that the last line of the statement "comprising the same or a different polymer" is logically applied to the optical alignment

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layers as well as the conventional alignment layer without any contradiction. In fact, Gibbons teaches different polymers, and states that each optical alignment layer is prepared from at least one hybrid polymer (page 29), which fully enables the embodiment of two photoalignment layers with different compositions that is presented in Gibbon's statement.

10. Applicant argues that while Yamazaki does disclose a ferroelectric liquid crystal which exhibits mono-stability and no smectic A phase in its phase series, the reference does not disclose anything related to the orientation defects of the liquid crystal which Applicant claims is an important feature in Applicant's invention since such a phase series easily generates orientation defects such as double domains in the absence of a smectic A phase, just as Gibbons is silent regarding the phase characteristics as well and orientation defects.

Applicant is respectfully apprised that it is precisely because the primary reference Gibbons is silent regarding the phase series of the ferroelectric liquid crystal that it would have been necessary and hence obvious to have looked to the prior art for suitable types. Applicant is correct in stating that Yamazaki does not disclose anything related to the orientation defects of the ferroelectric liquid crystal which exhibits mono-stability and no smectic A phase in its phase series. In fact, Yamazaki actually teaches that such a liquid crystal produces a half V-shaped switching mode which provides a low voltage driving and gray scale display (such electrooptical characteristic, [0159]), which Yamazaki teaches is highly desirable. Yamazaki teaches that such a liquid crystal is used in a liquid crystal display that is driven by a field sequential color system

([0157-0158]). The fact that Applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

In addition, Applicant has not provided data demonstrating that the use of a ferroelectric liquid crystal having no smectic A phase in a phase series thereof is indeed not useful in a liquid crystal display that is driven by a field sequential color system unless the two alignment layers are photoalignment ones with different compositions.

11. Applicant's arguments against Kim regarding the failure to teach that the constituent materials of the two alignment films are different from each other are rendered moot by the new rejection which addresses a new limitation that is a new issue. Applicant's arguments regarding the references as being silent regarding the problem of orientation defects, are similar to the arguments regarding Gibbons and Yamazaki not addressing the same problem, and are addressed below.

Applicant is respectfully apprised that it is precisely because the primary reference Kim is silent regarding the phase series of the ferroelectric liquid crystal that it would have been necessary and hence obvious to have looked to the prior art for suitable types. Applicant is correct in stating that Yamazaki does not disclose anything related to the orientation defects of the ferroelectric liquid crystal which exhibits monostability and no smectic A phase in its phase series. In fact, Yamazaki actually teaches that such a liquid crystal produces a half V-shaped switching mode which provides a low voltage driving and gray scale display (such electrooptical characteristic, [0159]),

which Yamazaki teaches is highly desirable. Yamazaki teaches that such a liquid crystal is used in a liquid crystal display that is driven by a field sequential color system ([0157-0158]). The fact that Applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

In addition, Applicant has not provided data demonstrating that the use of a ferroelectric liquid crystal having no smectic A phase in a phase series thereof is indeed not useful in a liquid crystal display that is driven by a field sequential color system unless the two alignment layers are photoalignment ones with different compositions.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number is (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks, can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sophie Hon/

Sow-Fun Hon

/KEITH D. HENDRICKS/

Supervisory Patent Examiner, Art Unit 1794